Green drying: continuous dehumidified-air dryer

Abstract

Non-thermal drying, such as dehumidified-air drying has been introduced to overcome the drawbacks of conventional thermal and direct contact adsorption drying. However, existing approach of this method is not so user friendly as the dehumidified-air cannot be supplied continuously due to the depletion of desiccants. The desiccants also need a high temperature for the regeneration. Therefore, a continuous dehumidified-air dryer is focused in this study. The dehumidified-air was produced alternately by adsorbents, which located in two chambers. The adsorbents were then regenerated at ambient temperature by pressure-swing concepts. This continuous dehumidified-dryer was commissioned by drying A. paniculata, at the dehumidified-air 10 to 30 L/min and 30 to 50°C. The sample was dried at less than 10 hours, and about 75 % of andrographolide had been maintained. The Page model was well describing the drying behaviour, and the diffusivity coefficient was determined as 1.88 x 10-13 m2/s.

Keyword: Dehumidified-air; A. paniculata; Drying; Pressure-swing; Drying kinetics